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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/749,498 | 12/31/2003 | Michael L. Rhodes | H0006018-0760(1100.123410 | 1218 |

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| EXAMINER | |
|---|---|
| CYGAN, MICHAEL T | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2855 | |

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/749,498 | RHODES ET AL. | |
| | Examiner | Art Unit | |
| | Michael Cygan | 2855 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-37 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10,12-18,21-24,26,27 and 34-37 is/are rejected.

7)☒ Claim(s) 11,19,20,25 and 28-33 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 06 July 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 13 July 2004.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Objections*

1. Claims 3-23 and 28-33 are objected to because of the following informalities: the term pacivating (or paciviating as stated in claim 21) is unclear. Neither specification, dictionary, nor art-accepted definition describes the metes and bounds of this term. The claims have been examined as the term was identical to the term "passivate." However, it pacivate and passivate are equivalent, then the art-accepted term passivate should be used in the claims. Failing that, an adequate definition of pacivate must appear in the specification, or be shown to be commonly recognized in the art. No new matter may be added. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 21-24, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Bosch (US 6,634,210 B1). Bosch anticipates the claimed invention.

With respect to claim 1: a particulate matter sensor comprising a mount [130], insulator [140], electrode [131,132], terminal (Figure 4), where the electrode is coated with an insulating film [1].

With respect to claims 21-23: a particulate matter sensor comprising a means for holding (mount [130]), means for pacivating is (film [1]), rod [100], and means for electrically connecting (terminal (Figure 4)). The invention is usable in exhaust gas monitoring for diesel engines; see column 1 lines 5-20 and column 11 lines 25-36.

With respect to claim 24: a method of placing an elongated piece of metal in an insulator, forming a terminal, and forming an insulation; see especially Figure 1 and column 7 lines 18+.

With respect to claim 27: a metal base [130], insulator [140], metal [131,132], film [1].

See entire document, especially column 1 lines 5-20; column 4 lines 38-45; column 5 lines 6-26; and column 7 lines 18-51. The invention is usable with spark-plug type sockets; see column 11 lines 18-23.

3. Claims 1, 34, and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by DE 10128869 A1 (Gloger). Gloger discloses the claimed invention, a particulate matter sensor comprising a tailpipe mount [6], insulator [3], electrode [2], terminal [4], where the electrode is coated with an insulating film [1]. The electrode is construed to contain the conductive member inside the tailpipe [6], including the member [2] shown vertically in

Fig. 1 and the portion of the member [4] shown horizontally which lies inside the pipe. The terminal is construed to contain portion of the conductive member [4] which lies outside the pipe. A processor [13] is connected to the sensor and to additional engine sensors (Figure 2), providing control signals to the engine for affecting fuel injection timing (paragraphs 21-24). The coating may comprise cerium oxide (paragraph 11).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE 10128869 A1 (Gloger) in view of Kimberely (US 4,485,794). Gloger teaches the claimed invention except for the use of controlled valves affecting gas recirculation percent. Kimberely teaches the use of a particulate level monitor which controls a valve affecting gas recirculation percent; see abstract and column 7 lines 18+. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a controlled EGR valve as taught by Kimberely in the invention taught by Gloger, since this allows exhausted particulate level to be advantageously controlled (see Kimberely column 1 lines 18-33).

5. Claims 1, 8-9, 13, 21-24, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,466,022 B1 (Koopmans) in view of DE 10128869 A1 (Gloger). Koopmans teaches a particulate sensor in the form of a spark plug.

With respect to claim 1, a mount [10], insulator [11], electrode [8, bottom], and a terminal [8, top].

With respect to claims 8-9 and 13: a spark plug having center electrode [8, top], metal rod [8, middle, bottom].

With respect to claims 21-23: a particulate matter sensor comprising a means for holding (mount [13]), rod [8], and means for electrically connecting (Figure 5). The invention is usable in exhaust gas monitoring for soot in diesel engines; see column 1 lines 11-20.

With respect to claim 24: a method of placing an elongated piece of metal in an insulator and forming a terminal; see especially Figure 5 and column 3 lines 50+.

With respect to claim 27: a metal base [10], insulator [11], and metal [8].

See especially column 3 line 31 through column 4 line 59.

Koopmans teaches the claimed invention except for the use of an insulating film on the electrode. Gloger teaches coating a spark plug electrode with an insulating film such as cerium oxide which acts as a pacivating layer; see paragraphs 11, 24. It would have been obvious to use an insulative coating as taught by Gloger in the invention

taught by Koopmans to coat the spark plug electrode, since Gloger teaches that this prevents sooting and unwanted ignition effects on the electrode (paragraph 24).

6. Claims 2, 3, 5-7, 10, 12, 14, 15, 17, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,466,022 B1 (Koopmans) in view of DE 10128869 A1 (Gloger) as applied to claims 1, 8-9, 13, 21-24, and 27, further in view of U.S. 6,583,539 B1 (Zamora). The claimed invention is considered to be taught except for the electrode being made of stainless steel. Zamora teaches a spark plug in which the material for the electrode is preferably stainless steel; see column 4 lines 3-5. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use stainless steel as taught by Zamora in the invention taught by Koopmans to form the electrode, since Zamora teaches stainless steel as a preferred electrode material.

With respect to the type of stainless steel (e.g., 304), it would have been obvious to one having ordinary skill in the art at the time the invention was made to use 304, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. See *In re Leshin*, 125 USPQ 416.

With respect to the length and thickness of the rod, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the claimed ranges, since it has been held that where the general conditions of a claim are

disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,466,022 B1 (Koopmans) in view of DE 10128869 A1 (Gloger) as applied to claims 1, 8-9, 13, 21-24, and 27, further in view of U.S. 6,341,501 (Sugimoto). The claimed invention is considered to be taught except for attaching a metal rod to the center electrode. Sugimoto teaches assembling a spark plug by attaching a metal rod [4] to a center electrode [3,33]; see Figures 1-2. It would have been obvious to construct the spark plug as taught by Sugimoto in the spark plug taught by Koopmans to form the spark plug, since Sugimoto teaches advantages of corrosion resistance; see column 1 lines 45-50.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,466,022 B1 (Koopmans) in view of DE 10128869 A1 (Gloger) and in view of U.S. 6,583,539 B1 (Zamora) as applied to claim 3, further in view of U.S. 6,512,375 (Yamada). The claimed invention is considered to be taught except for an amplifier. Yamada teaches an amplifier in a spark plug particulate detection system; see abstract; Figures 9 and 10; column 3 lines 1-24; column 14 lines 3-16 and lines 49-57. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an amplifier as taught by Yamada in the invention taught by Koopmans to

form a calculating circuit, since Koopmans teaches that his mitigates the processing load on a post-processing system while supplying calculations of the spark plug fouling to a data processing system; see column 16 lines 14-39.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,466,022 B1 (Koopmans) in view of DE 10128869 A1 (Gloger) as applied to claim 9, further in view of U.S. 6,512,375 (Yamada). The claimed invention is considered to be taught except for an amplifier. Yamada teaches an amplifier in a spark plug particulate detection system; see abstract; Figures 9 and 10; column 3 lines 1-24; column 14 lines 3-16 and lines 49-57. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an amplifier as taught by Yamada in the invention taught by Koopmans to form a calculating circuit, since Koopmans teaches that his mitigates the processing load on a post-processing system while supplying calculations of the spark plug fouling to a data processing system; see column 16 lines 14-39.

***Allowable Subject Matter***

10. Claims 11, 19, 20, 25, and 28-33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims,

since the prior art neither discloses nor fairly teaches a particulate detector having a stainless steel center electrode pacivated with an oxide of the steel, or a detector having a forming of a pacivating film from stainless steel.

***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Spark plug detectors are disclosed by Sarholz (US 4,307,061), Murata (US 5,180,983), Bosteels (US 2003/0234012 A1), JP 60100046A abstract, JP 60039453A, and JP 60123761 A. Merk (US 5,681,986) discloses a stainless steel particulate sensor. Sequerra discloses the use of 304 type stainless steel electrodes in spark plugs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cygan whose telephone number is (571) 272-2175. The examiner can normally be reached on 8:30-6 M-Th, alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on 571-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MICHAEL CYGAN, PH.D.
PRIMARY EXAMINER